coursed header work, in which headers of an equal height and parallel joints are laid round in a similar manner to brickwork.

There is always something stiff and formal about this kind of work, from the large size of the joints marking out each stone in distinct individuality.

To make the matter worse, the work is generally finished with a raised or a sunk joint, and the mortar coloured of a deep blue colour; sometimes we see the work *even* tuck-pointed, as though it were designed to set each stone in a frame.

'*Coursed header work*' is particularly inapplicable to the free forms of pointed architecture. If used at all, the stones should be laid in ragstone lime mortar, not *chalk lime*, and the joints simply struck. As far as appearance goes, it would be almost better that they were left rough. Chalk lime should be especially eschewed as both æsthetically and practically bad. It will not adhere to the ragstone, and the difference of colour is more offensive than when *blue* mortar is used.

'*Random-coursed work*' was that adopted by our ancestors in the best ages of our national style,* when to beauty of design was added skill and certainty in execution, and an improved way of setting about things. Previous to the latter part of the decorated period, even in the most magnificent edifices, there will be found much slovenliness of execution, and many defects that seem to have originated in the absence of a general system of direction; and some little betrayal of the fact, that when the fine old freemasons set to work they did not always know what to be at. Every one must have noticed the superior certainty of execution, and general completeness and accordance of parts that prevailed a few years later, and the improvements in mechanical skill and practical knowledge appear to have fully kept pace with the refinement in taste. One result of this change was the substitution of 'random-coursed work' for the rubble walling formerly in use; so rude is most of the ragstone building during what is usually termed the early English and decorated (I will not say the Norman) periods, that the whole appearance is that of the materials having been thrown 'pell-mell' in between a double board of boards; in fact, concreted in.

Of the appearance of work so executed I will say nothing, as this kind of building, when *connected with antiquity*, does not want for admirers; but any one who has been concerned in the renovation of churches in the south-eastern part of our island, will have no doubt of its instability."

"The durability of buildings erected with ragstone depends mainly upon the qualities of the *lime* from which the mortar is made. The worthless nature of what is generally sold as London lime is well known; but all its bad properties are exaggerated when used with ragstone instead of brick, even grey stone (*i. e.* grey chalk) lime, though greatly superior to the lime burnt from white chalk, is deficient as a cementing substance when used with ragstone.

The durability of ragstone wall work can only be depended upon when executed with mortar made with lime burnt from the ragstone itself; this mortar becomes in the lapse of time so very hard as to form almost one and the same body with the stone. Many buildings may be seen that have been erected a number of years, that retain the original pointing in the joints, fair as when first finished, and so hard as to resist the blow of a chisel."

Mr. Whichcord gives the following average list of prices of stone of various kinds in the quarry, and the rate at which it can be supplied in London alongside the wharf, together with some prices paid for labour upon the stone:

	At quarry. £.	s.	d.	In London. £.	s.	d.
Rough rag, per ton	0	1	6	0	5	0
Headers, per ton	0	8	0	0	12	6
Rag for breaking, per chord	0	1	6	0	5	0
Rag for lime, per chord	0	2	6	0	6	0
Hassock, roughly squared, per chord	0	3	0	0	6	6
Hassock, best, per chord	0	4	0	0	7	6
Ashlar, scapled out, per foot cubic	0	2	0	0	2	9
Ashlar, large scantlings	0	2	6	0	3	3
Lime (per load of 36 bushels)	1	0	0	1	4	0

* By far the best example of ragstone work near London is done in this manner at the new church at Homerton.

It would, in most cases, be cheaper and otherwise preferable to burn the lime in London.

Prices of Labour on Ragstone in Maidstone.

	s.	d.
Beds and joints (usually measured as plain work)	0	8
Plain picked face	0	8
Plain close picked in a superior manner	0	10
Tooled face	1	4
Sunk work	1	0
Sunk and tooled	1	8
Moulded	2	6
Circular plain	1	0
Circular and tooled	1	8
Circular sunk and tooled	2	0
Circular moulded and tooled	3	6

The pamphlet concludes with extracts from specifications of works executed in Kentish ragstone, to serve as precedents, and is altogether well entitled to consideration.

THE LAWS OF SOUND IN THE CONSTRUCTION OF BUILDINGS.

On the 8th inst., Mr. Scott Russell lectured at the Royal Institution "On the application of certain laws of sound to the construction of buildings," a subject of considerable importance, and at present little understood even by those best informed upon it. As we were not present on the occasion, we avail ourselves of a report which appeared in the *Literary Gazette*.

At the commencement of his discourse, Mr. Scott Russell read letters referring to the unfitness of almost all the large rooms which have been built in London for public speaking or public singing. In one it was represented that the chorus singers, on the opposite sides of the orchestra, were unable to hear each other. In another, the speaker had the sensation of speaking through a wet blanket. In another, the walls of the room appeared to carry on a running accompaniment to the singer, but in a discordant key. Referring to these instances of the acknowledged unfitness of so many public rooms for the purpose for which they were constructed, Mr. S. Russell proposed to consider—1st, the nature of these defects; 2ndly, their causes; and 3rdly, what remedies would be most likely to counteract them. Characterising a room designed for the distinct transmission of sound as a great ear-trumpet, the lecturer alleged that, when it failed in its purpose, the failure was attributable to one or more of the following causes:—1, *resonance*; 2, *echo*; 3, *interference*; 4 *repetition*; 5, *disturbance*; 6, *reverberation*. Before addressing himself to the details of these defects and their correction, Mr. S. Russell adverted to what he described as a philosophical error in regard to the undulations of sound. He denied that there was any analogy between the air-wave and the wave caused by dropping a stone into still water. He asserted that the sound-wave was identical with that wave which he had previously described as the *wave of translation*, and maintained that this wave, whether in an elastic or an inelastic fluid, moved with a velocity proportioned to the depth of the fluid in which it was propagated. He contended that there was a great difference between the reflection of sound and that of light, or of elastic bodies; that, when sound impinges at a very acute angle on a flat surface, it is not reflected, but that it rolls along the surface, occasioning what he has termed a *lateral accumulation*. This lateral accumulation causes the defect of *resonance*—it occurs in oblong rooms whose length is disproportioned to their breadth. In these the voice of the speaker soon strikes the walls of the room at the angle before alluded to, and then becomes dissonant. The remedy in such a case is to curve off the end of such a narrow room, as has been done in old churches. With regard to the disturbance occasioned by *echo*, it was presumed that the sound-wave causing this defect might be made to escape by interposing obstacles of an irregular form at the end of the hall or church where it prevailed. The defect of *interference* was said to consist in the effect produced by a voice heard in one of two rooms at right angles with each other, these rooms not being in certain proportions (as that of 32 to 24) to each other. When these proportions were deviated from, the sound occasioned something like what is technically called a *beat*. To this cause Mr. S. Russell referred the difficulty of speaking in a room which was lighted by a high lantern. This evil was to be mitigated by placing the speaker or singer in the angle formed by the two rooms, and by opening doors in those parts of the two rooms at which the wave of lateral accumulation would find the easiest escape. The defect of *repetition* was occasioned by the ordinary phenomena of reflected sounds; and that of *disturbance* by the discordant admixture of other sounds, as that of coughing, &c. In this instance it is the great object of scientific contrivance to catch up and to smother such incongruous noises. *Reverberation* is a dissonance which only occurs in the largest rooms: a striking instance of it is heard in the sound produced by the shutting one of the outer doors of St. Paul's. This noise is not the effect of reflection, but is a case of *lateral accumulation*, occasioned by the sound striking the wall at an angle less than 40°. In conclusion, Mr. S. Russell suggested that the great requisite in rooms destined for the harmonious diffusion of sound was to prevent reflection from walls by small chambers, as the boxes in a theatre; and by arranging the audience so that while no one interferes with the other, their persons may, by the mode of their distribution, prevent many of the defects already noticed. He had suggested a curve, which he described as the *isacoustic curve*, for affording equal facility of hearing to every individual in a large assembly. This curve had been adopted in the arrangements for the congregations in the 450 Free Churches recently built in Scotland; and two other very dissimilar buildings, both celebrated for easy transmission of sound, the Opera House, and the Theatre of the Royal Institution, were arranged in a very near approximation to this curve.

MARKET PLACES.*

When the *Prefet de la Seine* decided upon erecting a new market-hall in Paris, previous to the plans being completed, a commission was sent out to visit various countries, and study the establishments of that kind. It consisted of Messrs. Anger, Inspector-General of Market-halls of Paris; V. Ballard, architect; and A. Husson, chief clerk of the Perfecture de la Seine. Details are given by the commissioners on the markets of London, Manchester, and other cities. While the advantages of our establishments are placed in relief, with the usual urbanity of Frenchmen, yet they could not quite blink the inconvenience of some of our *mediæval* conceits, amongst which Smithfield plays a conspicuous part. "Who should believe," they say, "that this immense metropolis has no exterior market-place for cattle? It is in the midst of the city, a few paces from the Cathedral of St. Paul, where all this host of animals are driven to and sold. Smithfield is the *beau ideal* of disorders in the way of markets—the shifting of cows, bullocks, and horses; the peregrination of herds of sheep and swine; the escaping of half-furious beasts; the howling of dogs, shouting of drivers, screams of frightened passers-by—add to this, that the streets through which this world of beasts pass, are choaked by this throng, dirtied by their excrements, *et cetera*. Whence comes all this inconvenience? It is because the corporation opposes its removal, leaning upon a statute enacted by Edward III.—*five hundred years ago*." Then follow some observations on the immorality of such wholesale slaughter, before the eyes of an uneducated, prone-to-evil mass of the people; which, however, to detail does not fall within the scope of our journal. The strictures which our worthy commissioners pass on Shude-hill Market, Manchester, are interesting and instructive; but we must refer those interested in *states-architecture* to the report itself.—Of Munich, the work says, very truly and tartly, "There, the decorative arts leave nothing to be desired, save the application to useful purposes, viz.: lighting of streets, paving, and market-places."

The report is adorned with elevations and plans. It is thus that, by observation and study *in situ*, the municipality of Paris have given a good example how corporations and nations may learn from each other.

* Official Report on the Public Market-places in England, Belgium, Holland, and Germany.—Rapport sur les Marches Publics, &c. Paris, 1846, 8vo.

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